Topic 08 – Rehabilitation / Sports medicine

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Cardiac rehabilitation in chronic heart failure: effect of a 8-week high-intensity interval training vs continuous training with regard to variables commonly used in clinical practice

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Purpose: It has been demonstrated that aerobic interval training is feasible for the treatment of heart failure. It can be superior to continuous training for patients with post infarction heart failure.

The objective of this study was to compare the effects of a short innovative high-intensity interval training protocol versus continuous retraining on aerobic capacity and functional capacity in patients with chronic heart failure (CHF).

Methods: 26 patients with CHF were enrolled in a 8-week cardiac rehabilitation program. Patients were divided into two groups: one group performed rehabilitation with interval training exercises (IT) and the other group performed rehabilitation with continuous training exercises (CT). IT consisted in 3 series of 12 repetitions of 30 sec of exercise, followed by 60 sec of rest. The exercise intensity was 50 and 80% of the maximal power reached during a steep ramp test during the first 4 weeks and the last 4 weeks, respectively. CT consisted in 45 minutes of aerobic exercise corresponding to the heart rate at the first ventilatory threshold. Parameters of the physical capacity were assessed using a treadmill ramp test with gas exchange measurements and using a 6 minute walk test (6MWT).

Results: The IT group increased their peak VO_2 ($p<0.001$), the duration of the exercise test ($p<0.001$), the oxygen pulse ($p=0.029$) VO_2 and the time at the second ventilatory threshold ($p=0.006$ and $p<0.001$), and the distance performed at the 6MWT ($p<0.001$). The CT group increased only the time at the second ventilatory threshold ($p=0.004$) and the distance performed at the 6MWT ($p=0.050$) and these improvements were significantly higher for the IT group than for the CT group ($p=0.047$).

Conclusion: This study shows that, in patients with CHF, 8 weeks of high intensity interval training included in a rehabilitation program appears to be more effective than continuous training to improve some parameters of physical capacity.

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Acute coronary syndrome related to sport: profile and follow-up of a 25 cases prospective series.

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Acute coronary syndrome (ACS) related to sport is a rare and sometimes dramatic event. We aimed to define the profile of these patients (pts) and to investigate their prognosis.

Methods: prospective study of pts with ACS during or subsequent (2 hours) to a sporting activity. Cardiovascular risk factors (CRF), clinical and angiographic presentation were analyzed. The related sport and level of previous training were noted. A questionnaire was sent for follow-up (FU) evaluation: CRF control, occurrence of new events, resumption of sport, professional activity and quality of life (QOL) were studied.

Results: 25 pts (24 men), mean age 47 (±14) years, had an ACS related to sport. CRF were: smoking (9 pts), overweight (9), coronary heredity (7), hypercholesterolemia (6), hypertension (2) and diabetes (2). Twenty pts were doing a sport with high dynamic component; running (28%) and cycling (24%) were the most represented; 16 pts were regular exercisers (>3 hours per week). Particular circumstances included competition (6 pts), meteo (7) or altitude (1).

We observed 17 STMI and 2 aborted sudden deaths; 17 pts had single-vessel disease, preferentially active exercisers ($p=0.034$); minimal atherosclerotic plaques were identified with IVUS in 4 pts with normal arteries by angiography; 3 pts had a myocardial bridge.

The mean FU was 3 years: 3 pts were still smokers, 9 were overweight, 89% had a favorable lipid profile (LDLc <1 g/l). No patient died, 3 had a new ACS. All pts had resumed their professional activity (mean delay: 2,6 months); 21 pts took up sport again (mean delay: 8,6 months) and 32% amongst them rediscovered their original level. QOL was worse than before ACS, but was better in those who resumed sport ($p=0.01$).

Conclusions: pts with ACS related to sport are younger and appear to have a better prognosis than conventional coronary pts, partly due to their favorable coronary status and to the resumption of sport that allows a better control of CRF and improved QOL.

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Children athlete's heart: effect of age and gender on echocardiographic parameters

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The limits of athlete's heart patterns have been rarely described in athletes below 16 yrs old. This prospective study aimed to describe echocardiographic (echo) patterns recorded in a large population of French highly trained (≥8 hours/week) children according to their age and gender.

Methods: 1221 athletes had a clinical exam and a classical resting echocardiography. Four groups [58 young girls, 10-12 yrs (BSA=1.3±0.2 m^2); 495 old girls, 13-16 yrs (BSA=1.6±0.2 m^2); 107 young boys, 7-13 yrs (BSA=1.5±0.2m^2); 561 old boys, 14-16 yrs (BSA=1.8±0.2m^2)] have been compared.

Results: Mean overall population echo data were as follow: aortic diameter (Ao) 27.1±3.5 mm; left atrial diameter (LAD) 31.8±4.6 mm; left ventricular end diastolic diameter (LVEDD) 48.8±4.7 mm; wall thickness (WT) 8.6±1.4 mm; LV mass 141.3±41.4g; ejection fraction (LVEF) 67.1±6.2%; E/A ratio: 2.1±0.6.

In both gender groups, older children obtained higher absolute values than younger ones ($p<0.05$), except for LVEF and E/A ratio. However, when indexed by BSA, higher values have been observed in the youngest children ($p<0.01$), except for LV mass/BSA which remained higher in the older group ($p<0.05$). In both similar age groups, boys have higher absolute values ($p<0.05$), except for LVEF and E/A ratio. Indexed by BSA, higher values were obtained for LVEDD in girls ($p<0.01$) and for LV mass in boys ($p<0.001$). Only in the youngest group, Ao/BSA and LAD/BSA were higher in boys ($p<0.001$). No gender difference was observed for WT/BSA in both groups, and for Ao/BSA and LAD/BSA only in the oldest group.

Conclusions: Resting echocardiographic patterns in highly trained children depend on age and gender, which must be taken into account in the interpretation of absolute and relative parameters. Our results propose limits of athlete's echocardiographic patterns in highly trained children.

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